Evaluation of Remote Sensing in Control of Pink Bollworm in Cotton

Lowell N. Lewis, Principal Investigator
Virginia B. Coleman, Research Associate
Citrus Research Center/Agricultural Experiment Station
University of California, Riverside
Riverside, California 92502

Contract No. NAS5-21771
GSFC ID No. UN609

April 10, 1973
Type I Report for Period February, 1973 - March, 1973

Prepared for
Goddard Space Flight Center
Greenbelt, Maryland 20771

Agriculture/Forestry/Range Resources: Crop Survey and Classification

The purpose of our project is to identify and map cotton fields in the southern deserts of California. The California State Department of Agriculture has regulated the planting and plowdown dates of cotton in order to control the pink bollworm. At present the 800,000 acres of cotton in California are mapped by ground survey teams. It was felt that satellite data could provide a viable alternative to ground survey mapping.

To date, all fields that could be potentially cotton in the Imperial and Palo Verde Valleys have been mapped from January and February photography. Ground truth has shown that some of these fields may be planted to sudan grass, sorghum, asparagus, tomatoes, corn, or onions. All the preceding crops have been planted and are emerging. Cotton was late in planting due to heavy rains, therefore it is expected that all bare fields on the March imagery are most likely to be cotton. Also, all of the previous crops except asparagus will be harvested by mid-summer and can then be separated from cotton. Asparagus is harvested after cotton and can therefore be separated because it will still be growing when cotton is plowed down.

Evaluation of Remote Sensing in Control of Pink Bollworm in Cotton

Lowell N. Lewis, Principal Investigator
Virginia B. Coleman, Research Associate
Citrus Research Center/Agricultural Experiment Station
University of California, Riverside
Riverside, California 92502

Contract No. NAS5-21771
GSFC ID No. UN609

Objective

The purpose of our project is to identify and map cotton fields in the southern deserts of California. The California State Department of Agriculture has regulated the planting and plowdown dates of cotton in order to control the pink bollworm. At present the 800,000 acres of cotton in California are mapped by ground survey teams. It was felt that satellite data could provide a viable alternative to ground survey mapping.

Summary of Work

To date, all fields that could be potentially cotton in the Imperial and Palo Verde Valleys have been mapped from January and February photography. Ground truth has shown that some of these fields may be planted to sudan grass, sorghum, asparagus, tomatoes, corn, or onions. All the preceding crops have been planted and are emerging. Cotton was late in planting due to heavy rains, therefore it is expected that all bare fields on the March imagery are most likely to be cotton. Also, all of the previous crops except asparagus will be harvested by mid-summer and can then be separated from cotton. Asparagus is harvested after cotton and can therefore be separated because it will still be growing when cotton is plowed down.

Work for the next reporting period will include mapping of all bare fields from March imagery for the Imperial, Palo Verde, and Coachella Valleys and preparation and distribution of the maps to the various county agricultural agents for comparison with their field data. The agents will be asked to submit a cost/benefit analysis regarding satellite versus ground survey mapping.

Significant Results

There are none at this time.

Progress

There are no problems impeding progress. All ground truth is being excluded from use until photo interpretation is completed to ensure reliability of results. The work schedule is on time; funding is adequate. An abstract of the paper presented at the March ERTS-1 Symposium is included. Mr. Claude Johnson, Research Specialist in the Department of Geography at the University of California at Riverside, was hired half-time for the month of March to help with the analysis and interpretation of imagery and for field work. On the whole, the project is going very well despite the inconvenience of having to prepare so many managerial reports.

Data Requirements Information

There are no changes in standing orders or descriptor forms. A request for data was made but the copy of the data request has been misplaced, thus the information is not available for this report.

EVALUATION OF REMOTE SENSING IN CONTROL OF PINK BOLLWORM IN COTTON[1]

Virginia B. Coleman, Claude W. Johnson, and Lowell N. Lewis

Citrus Research Center/Agricultural Experiment Station, Department of Geography, and Citrus Research Center/Agricultural Experiment Station, University of California, Riverside 92502

ABSTRACT

The purpose of our project is to identify and map cotton fields in the southern deserts of California. Cotton in the Imperial, Coachella, and Palo Verde Valleys is heavily infested by the pink bollworm which affects both the quantity and quality of the cotton produced. The California State Department of Agriculture, therefore, has regulated the growing season of cotton by establishing planting and plowdown dates. These procedures ensure that the larvae, whose diapause or resting period occurs during the winter months, will have no plant material on which to feed, thus inhibiting spring moth emergence.

There are approximately 800,000 acres of cotton in California and they are mapped yearly by ground survey teams. A more practical means of accomplishing that objective seemed necessary and satellite data from ERTS-1 was considered a viable alternative.

The underflight data from the U-2 aircraft has shown that we can detect the differences between a growing, a defoliated, and a plowed down field providing that we know where the fields are. The ERTS-1 multispectral scanner (MSS) data are being analyzed using an I^2S (International Imaging Systems) optical color combiner to determine which combinations of dates and colors will identify cotton fields and thus provide the data needed to produce maps of the fields for the forthcoming cotton season.